Active Project (2016 - 2016)

A Novel Cleaning Technology for Spacecraft Habitat, Phase I Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)

ABSTRACT

There is currently no space based laundry technology. Traditional laundry uses a large amount of surfactants, which results in a substantial organic contaminant burden on downstream wastewater processors. Using cleaning wipes to clean crew contacted surface also generates solid wastes. In this project, based on its success on high performance superhydrophobic and antimicrobial coatings, nGimat proposes to develop a novel cleaning technology, which can be applied onto a wide range of crew contacted surfaces and fabrics. The proposed effort by nGimat will create functional surfaces via CCVD so that surfactants are no longer needed to clean and much less solid wastes will be generated. In the meanwhile, the technology will also provide a cleaning pad to collect and hold the cleaning water/solution and dust for easy recycling and regeneration of cleaning water in microgravity environment, which will significantly reduce resource and energy usage and improve comfortableness and safety of the space habitats.

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: The proposed technology could find direct use in NASA's space habitats for long human missions, in microgravity, and on planetary surfaces, by forming an easy cleaning surface on a wide range of substrates, including both rigid and flexible materials. The super-omniphobic antimicrobial coatings can grant not only excellent water repellency and oil resistance, but also active self-cleaning performance and bacteria resistance, thus they can be used as high protective surfaces. A special cleaning pad optimizes the use of limited resources.

To the commercial space industry:

Potential Non-NASA Commercial Applications: In addition to the significant NASA's needs, the demand for easy-cleaning or self-cleaning surfaces are widely needed for high protective clothing,

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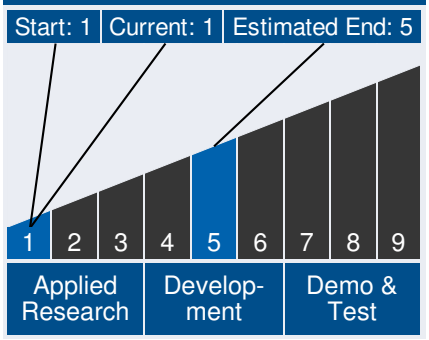
Technology Maturity



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

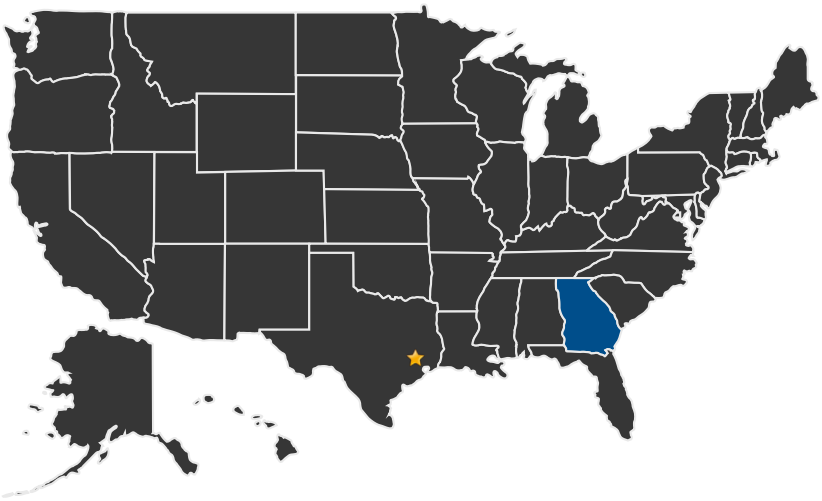
Program Manager:

- Carlos Torrez

Continued on following page.

functional outdoor clothing, window glass, bath and kitchen surfaces, medical devices, sensors, and electronic components, etc. Wide usage of the proposed technology would result in significantly improved safety, comfortableness and reduce energy and resources needed for cleaning and launderings. Thus any common carriers, such as airlines, taxis and public transportation, would benefit greatly. The NASA/military will benefit from the dual use nature of this technology.

U.S. WORK LOCATIONS AND KEY PARTNERS



U.S. States With Work

Lead Center:
Johnson Space Center

Other Organizations Performing Work:

- MicroCoating Technologies (Chamblee, GA)

PROJECT LIBRARY

Presentations

- Briefing Chart
  - (http://techport.nasa.gov:80/file/23250)

Management Team *(cont.)*

Principal Investigator:

- Yun Zhang

Technology Areas

Primary Technology Area:
Human Health, Life Support, and Habitation Systems (TA 6)
└ Environmental Control and Life Support Systems and Habitation Systems (TA 6.1)
  └ Habitation (TA 6.1.4)

A Novel Cleaning Technology for Spacecraft Habitat, Phase I Project

IMAGE GALLERY

A Novel Cleaning Technology for Spacecraft Habitat, Phase I

DETAILS FOR TECHNOLOGY 1

Technology Title

A Novel Cleaning Technology for Spacecraft Habitat, Phase I

Potential Applications

The proposed technology could find direct use in NASA's space habitats for long human missions, in microgravity, and on planetary surfaces, by forming an easy cleaning surface on a wide range of substrates, including both rigid and flexible materials. The super-omniphobic antimicrobial coatings can grant not only excellent water repellency and oil resistance, but also active self-cleaning performance and bacteria resistance, thus they can be used as high protective surfaces. A special cleaning pad optimizes the use of limited resources.